



## UNIVERSITI TEKNOLOGI MARA

### CMT585: PETROLEUM TECHNOLOGY

<b>Course Name (English)</b>	PETROLEUM TECHNOLOGY <b>APPROVED</b>
<b>Course Code</b>	CMT585
<b>MQF Credit</b>	3
<b>Course Description</b>	The course covers description of the chemical compositions and physical properties of petroleum, petroleum drilling, completions and production, reservoir mechanics, fundamentals of rock and fluid properties, petroleum products, natural gas and petrochemical feedstocks. This includes methods for fractionation and analysis both oil-well and pipeline quality, the chemical basis of the central refinery processes and an overview of the spectrum of products from oil refining. Additional subjects include natural gas processing from well to plant and petrochemical processing and economics
<b>Transferable Skills</b>	Upon completion of this course, the students should be able to ; 1. Relate and explain the chemical composition and properties of crude oil, petroleum products, petrochemical and natural gas. 2. Describe and demonstrate the basic principles and concepts of crude oil, natural gas and petrochemical treatment and processing. 3. Restate and illustrate the different manufacturing processes involved in the treatment and processing of crude oil, natural gas and petrochemicals. 4. Verbally and visually relate and discuss the factors which govern the processing design of crude oil, natural gas and petrochemical processes. 5. Apply and appraise data for an economic evaluation in order to analyse and determine economic problems and their impact on the manufacturing processes of crude oil and natural gas.
<b>Teaching Methodologies</b>	Lectures
<b>CLO</b>	<p>CLO1 State and explain terms associated with crude oil and natural gas feedstock and products characterization, petroleum and natural gas processes such as distillation, fractionation, conversion processes and treatment processes.</p> <p>CLO2 Restate and identify the different types of treatment processes which are desalting, solvent extraction and hydrotreating.</p> <p>CLO3 State, identify and describe the different types of conversion processes in petroleum processing for example thermal cracking, flexicoking, catalytic cracking, catalytic reforming and hydrocracking.</p> <p>CLO4 Examine and differentiate the processes involved in the treatment and processing of crude oil, natural gas and petrochemical.</p>
<b>Pre-Requisite Courses</b>	No course recommendations
<b>Topics</b>	
<b>1. Introduction and Overview of Crude Oils &amp; Coal</b> 1.1) Oil & Gas : Formation of Crude Oils, hydrocarbons and refinery products 1.2) Crude oil exploration 1.3) Refinery Feedstocks & products 1.4) Basic Refinery process : Description and history	
<b>2. Natural Gas Processing</b> 2.1) Overview of Gas Field Processing 2.2) Sour Gas Treating 2.3) Gas Dehydration 2.4) Recovery, Separation and Fractionation of Natural Gas Liquids	
<b>3. Crude Distillation</b> 3.1) Desalting of Crude Oil & Sweetening 3.2) Atmospheric and Vacuum Distillation 3.3) Crude oil, Residual oil, Light and Heavy Distillate Processing 3.4) Light Hydrocarbon, Oxygenates and treating processes	

**4. Conversion Processes**

- 4.1) Thermal and Coking Processes
- 4.2) Catalytic Cracking Processes
- 4.3) Catalytic Reforming and Isomerization
- 4.4) Catalytic Dewaxing and Hydrotreating

**5. Treatment Processes**

- 5.1) Hydrotreating
- 5.2) Solvent extraction, solvent dewaxing, solvent deasphalting

**6. Petrochemical Processes**

- 6.1) Aromatics production
- 6.2) Unsaturated Production
- 6.3) Saturated Production

**7. Coal Processing**

- 7.1) Coal Gasification
- 7.2) Coal Liquefaction

Assessment Breakdown	%
Continuous Assessment	60.00%
Final Assessment	40.00%

Details of Continuous Assessment	Assessment Type	Assessment Description	% of Total Mark	CLO
	Assignment	One assignment	20%	CLO2
	Quiz	Written quiz on the fundamental of petroleum technology including crude and natural gas processes.	20%	CLO1
	Test	One Written Test	20%	CLO3

Reading List	Recommended Text	<ul style="list-style-type: none"> <li>• James H. Gary and Glenn E. Handwerk, <i>Petroleum Refining, Technology and Economics</i>, 3 Ed., Marcell Dekker</li> <li>• Solomon and Fryhle, <i>organic chemistry</i>, 8th Ed., wiley international</li> <li>• Shreve, <i>Chemical Process Industries</i>, 5th Ed., McGraw Hill</li> </ul>
Article/Paper List	This Course does not have any article/paper resources	
Other References	<ul style="list-style-type: none"> <li>• Website ASTM <i>Significance of Testing of Petroleum Products</i></li> <li>• Website Kirk and Other 1984, <i>Encyclopedia of Chemical Technology</i>, John Wiley and Sons</li> </ul>	